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## NOTES ON THE FAUNA OF THE ISLANDS OF FERNANDO DE NORONHA.

BY JOHN C. BRANNER.

FERNANDO DE NORONHA is a small group of islands in the south Atlantic, about 230 miles northeast of Cape St. Roque, and belonging to Brazil. It is only six miles long by about two wide. There is no important settlement upon it, and though it lies near the track of vessels plying between European ports and those lying south of the Cape, it is seldom visited by steamships and rarely by sailing vessels.

Very little is known of the natural history of this island. A very brief visit was made to it by Darwin in his famous voyage around the world, but the time he spent upon it—only a few hours—did not enable him to do much towards studying its natural history. In 1873 the Challenge Expedition landed here, but as the island is used for a penal settlement, the officer in charge of the colony would not give the party permission to make explorations. The few notes made by Mr. Darwin, and those of the Challenger party, furnish almost all the trustworthy information thus far published concerning it.

In 1876, when a member of the Imperial Geological Survey of Brazil, I visited Fernando de Noronha, and spent the months of July and August there, during which times the following notes were made upon its fauna:

The island is inhabited by a vast number of birds, most of

them sea-birds which flock and breed about the inaccessible crags and the small islands and rocks off the main island, and being but little disturbed by visitors, they are not timid, and may often be killed with clubs or caught with the hand.

One of the most interesting and beautiful birds on the island is the wig-tail, a white bird about the size of a pigeon, having two long flexible, streamer-like tail feathers.<sup>1</sup> These birds nest and roost mostly upon the lofty sides and about the summit of the great peak. At every hour of the day they may be seen hovering about this majestic rock like great white butterflies, or resting upon the little niches on its sides—white specks against the dark background. When seen at any considerable distance from their nests or roosting places they usually fly in pairs, side by side, each following the other's motions so exactly that one is at first inclined to think by some optical delusion there is but a single bird where two appear. They seldom fly in a straight line, but rise and fall and zigzag like butterflies.

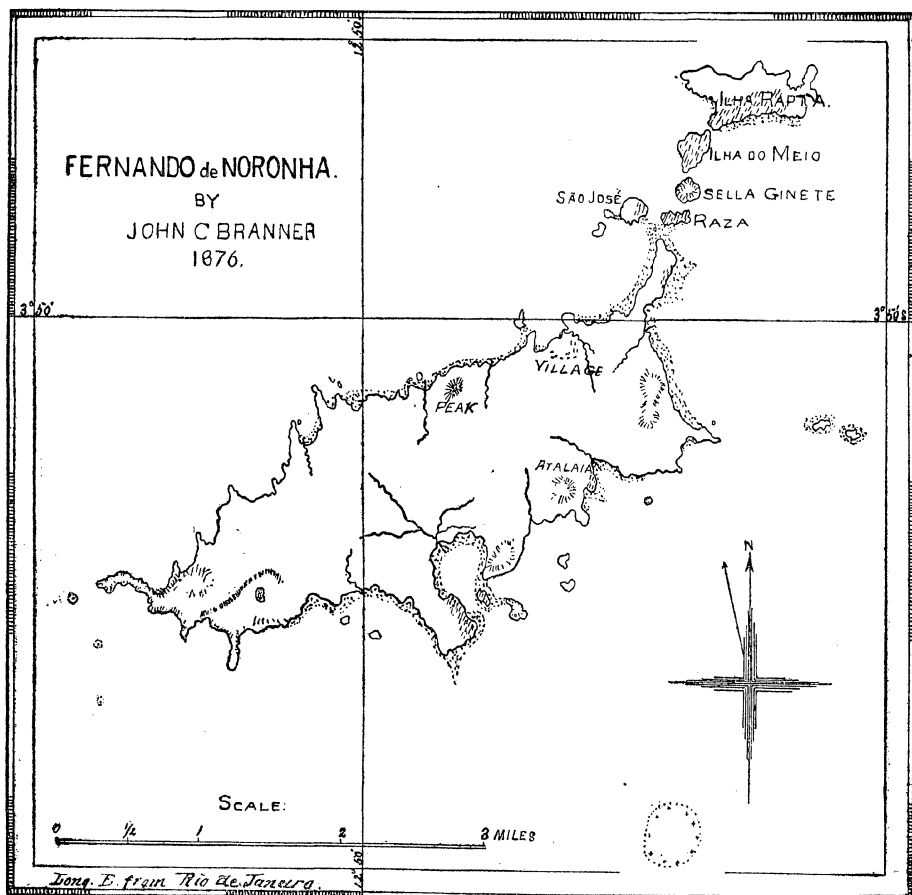
Rats and mice exist here in such numbers as, at times, to constitute a very serious pest and drawback to agriculture. It is recorded that during the occupancy of northern Brazil by the Dutch, about 1630, Fernando de Noronha was abandoned "by reason of the vast numbers of rats which consumed all the fruits of the earth."<sup>2</sup> As one walks through the fields or along the paths he constantly hears their rustling on all sides, and sees them darting here and there through the grass. A certain number of the convicts are assigned to the work of rat-killing, and each one is required to kill a specified number of rats every days. The number is incredibly large—somewhere in the hundreds—but I made no note of it, and dare not speak from memory. Cats and dogs have been imported in the hope that they might aid in the extermination of the plague, but though they usually kill them eagerly during a few days, they soon become so accustomed to their presence that they cease to pay the least attention to either rats or mice.

I made no notes upon the occurrence of rats and mice upon Ilha Raza and Sao José, and do not recall having seen them on

<sup>1</sup> The inhabitants call these birds by the very appropriate name of *rabo de junco*—reed tail.

<sup>2</sup> John Neuhoﬀ in Pinkerton's *Voyages*, vol. xiv., p. 701.

those islands. Upon Ilha Rapta there are no rats, but mice are even much more abundant than on the main island. If they constitute a plague upon the main island, what shall be said of them here? It is simply impossible to realize, without having seen and experienced them, how mice can exist in such numbers. I spent a night on this island, the guest of the three convicts occupying



the place at the time. My hammock was suspended in the solitary grass-thatched hut, and at night I tried to sleep there, but with very poor success. The mice were all over the floor of earth, in

<sup>1</sup> This island is usually and erroneously called Rat Island, an error due probably to the fact that the *p* in *Rapta* is silent, and is supposed to mean rat, which it does not. *Rapta* is from the verb *raptar*, to steal, and Ilha Rapta translated into English would be Robbers' Island, or literally, Stolen Island.

the walls of thatch, in the roof, among the pots and pans—everywhere. No sooner did I lie down in my hammock than they made their way down the cords and into my bed. During the early part of the night I amused myself by allowing them to reach the middle of the taut hammock cords, when, by striking the cords a sharp blow, the vibrations would shoot them off into space. This ceased at length to be amusement, and when, late in the night, I occasionally fell asleep, it was only to be awakened in a few moments by the mice nibbling at my face or hands or feet, or by their falling upon me from the roof.

The occurrence of rats upon the main island and of mice only upon Ilha Rapta may possibly be explained by the mice having been imported to the smaller from the larger island. The geology of this group of islands, however, suggests another plausible explanation. Fernando de Noronha and the small islands lying about the main one are of igneous rocks, with the exception of some limited exposures of comparatively recent calcareous sandstones formed by the consolidation of sand dunes. These calcareous sandstones form all of Ilha Raza and Ilha do Meio, the southwest third of Ilha Rapta, and overlie a portion of Sao José and the extreme northeast point of the main island. It occurs also at the southeast base of Atalaia Grande, and in the Bahia de Sudoest, where it forms Ilha de Chapeo and the shore of the bay in places.

In all these localities the sandstone is cut away on its southeastern side, and an abrupt or overhanging face is exposed to the ocean's surf, while its upper surface stands at an elevation of from thirty to fifty feet and more above the water. On the landward side of the exposures on Ilha Rapta, Sao José and the main island, these sandstone beds thin away to the west. These facts, and others which need not be mentioned here, go to show that the southeastern coast of these islands formerly extended much farther in that direction, and that the calcareous sands, of which these rocks are formed, were blown inland from the beach which once existed in that direction. The ocean, however, has gradually encroached upon the island, and especially from the east, until what was formerly one island has been separated into six, namely, Sao José, Sella Ginete, Ilhas do Meio, Rapta, Raza, and the main island.

The mice which are so abundant upon both islands now may

have been cut off from the main island and left upon Ilha Rapta when this separation took place. Whether they would survive upon the other islands, Ilha do Meio, Ilha Raza, etc., would depend entirely upon whether the conditions upon them for survival were favorable or otherwise, and their existence or non-existence at intermediate points would have but little bearing upon the question. It may be asked, in case this theory is correct, why we find no rats upon Ilha Rapta. This is possibly to be attributed to their having been entirely exterminated by the convicts.

Ilha Rapta is, in a sense, one of the institutions of the penal settlement. It has an area of less than a square mile, no wood, though it is said to have been wooded formerly, but little potable water, and, compared with the main island, it is very low. The soil is extremely fertile, and excellent sweet potatoes grow wild over a large part of it, while the waters about its shores swarm with edible fish and enormous sharks. When, at the time of my visit, and prior thereto, a prisoner upon the main island became particularly unmanageable, he was banished to Ilha Rapta, which was regarded as a sort of *insanctum insanctorum*, where he was left to his own devices for subsistence.

I learned from the commandant that formerly large numbers of convicts were banished to Ilha Rapta at the same time. Now it was generally understood when I was upon Fernando that rats were not uncommonly eaten by the convicts on the main island, and as those sent to Ilha Rapta were left to do as they saw fit, they were often reduced to great straits for food, and it does not seem improbable that they ate rats, if rats ever existed there. Then, too, when efforts were made to raise crops here, the rats, had they existed in such numbers as upon the main island, would simply have rendered such crops impossible. The area of the island is so small, and the places in which rats could hide so few, that their extermination would not be an impossible or even a very difficult matter.

I trust that the novelty of it will be sufficient apology for a short digression here to describe the method employed by the convicts on Ilha Rapta to catch fish. A hook attached to a line about 150 feet long, baited with a fresh sardine or the white skin of some other fish, is thrown out into the water and quickly drawn ashore.

The method is thus essentially trolling without a boat or spoon. One end of the line is tied to the fisherman's body, the line coiled and held in the left hand, while the baited hook, weighted with a bit of lead, is whirled rapidly above the head with the right hand, until the centrifugal force becomes strong enough to carry the line out to its full length when skilfully thrown. It is then allowed to escape, and the lead, carrying the line with it, shoots out over the water and drops. The line is then hauled in as rapidly as possible, and this rapid hauling in generally produces a whirling of the bait at which the fish strike. There is "many a slip," though, between hooking a fish and landing it; not that they are particularly game, but because the sharks are usually fishing at the same time and place. Not more than half the fishes I saw hooked here were landed entire; sometimes only half a one was hauled in, at others only a head, and sometimes the hook and part of the line were also missing.

Standing upon one of the overhanging rocks at the western end of the island I have looked down into the sea when it was comparatively smooth and seen hundreds of enormous sharks in the water, gliding over and about each other in their search for food.

Perhaps the most interesting vertebrate found on Fernando is a species of lizard—*Mabina punctatas*. The cultivation of almost all the tillable land on the island has had the tendency to drive these lizards into the rocky corners and uncultivated places, where they exist in such great numbers as to cause one to wonder how so many of them manage to live on so small an island. As they are but little disturbed, and have no natural enemies here, they are not very timid. Walking over the open, rocky places where there is no vegetation, one may see the lizards withdrawing down the sides of the rock fragments, apparently with much reluctance, at a distance of from three to six feet ahead of him. If he turn and look behind he will find them rapidly closing up the space yielded him for a passage. While seated upon the bare rocks I have often observed these little animals watching me, apparently with as much curiosity as I watched them, turning their heads from side to side as if in an effort to be wise. If I kept quiet for a few minutes they would creep up to me and finally upon me; if I moved, they

ran down the faces of the rocks, and turning, stuck their heads above the edges to watch me. I caught a great many of them<sup>1</sup> by keeping quiet until they came within easy reach and then snatched them. They bite freely, but their teeth are too short and weak to inflict a severe wound. Upon one occasion when climbing with my photographic apparatus up a steep bluff, where great care and attention had to be given to every step and motion, my movements were not sufficiently rapid and decided to keep the lizards off my person, and as neither of my hands was free, they became offensively familiar. Several of them crawled leisurely over me examining my clothing and my person, and one even got up the leg of my trousers, and for nearly an hour crept around and around my waist just below the band of my trousers.

I was told by the inhabitants that there was another kind of a lizard on the island which had two tails. I found, however, that the so-called forked-tailed lizard was the same as the above mentioned one. The tail of this species is long and slender, and is so easily broken that it was quite difficult to catch one without breaking off a portion of its tail. If the piece broken does not fall off entirely, the break may heal over sufficiently to hold it securely, while the growing out of the new tail gives the lizard a forked or double one. I have seen it stated, I believe in the Challenger reports, that this species has never been found elsewhere in the world than upon Fernando de Noronha, and that the species to which it is most nearly related occurs in Demerara.

I saw no snakes upon the island, and the old residents say there are none, save what is known in Brazil as the *cobra cega* (blind snake) or *cobra de duas cabeças* (double-headed snake). I found one specimen of this. It is a species of *Amphisbæna*.

Several insects are found, the most abundant of which is a species of wasp, which does considerable damage to grapes, and by building nests in the cajú trees renders itself very obnoxious. Spiders are also very abundant. A few beetles and butterflies were taken, but the material was turned over to Mr. Herbert H. Smith, and I am unable to say what they are. All kinds of domestic

<sup>1</sup> These specimens, like all the other material collected upon this island, was deposited in the Museu Nacional in Rio de Janeiro. As far as I know, none of it has ever been worked up.



*Fauna of the Islands of Fernando de Noronha.*

animals have been introduced upon the island, but they do not enter into the biologic question to which I would call attention.

It does not seem improbable that the original flora and fauna of Fernando were introduced here at the same time and from the same source. I regret that I made no notes of value upon the flora of the island, but I may call attention to this peculiarity of it: its large trees produce light wood, that is, wood that will float in the water. The flora of the Brazilian mainland is noticeable for the predominance of very heavy timber, most of which, even when well seasoned, is of too high specific gravity to float in salt water. One of the large trees of Fernando is the *Ficus noronhae*, a species first described from this island. Another is the *burra*, a species of laurel yielding a poisonous juice. I believe I have seen the laurel in the highlands of the province of Minas Geraes, but I am not quite positive about the identity.

The question naturally arises: Where did the animals inhabiting this island come from originally, and how did they get to Fernando de Noronha?

The first answer which suggests itself is that they have been imported by man's agency since the place was discovered. Very fortunately we have valuable documentary evidence upon this subject. The following is a translation of the oldest document in existence referring to the island of Fernando de Noronha:—

" . . . . In view of the services which Fernam de Noronha, cavalier of our house, has rendered, and which we shall expect of him hereafter, and desiring to show him grace and mercy, we are pleased to bestow upon him henceforth for all the days of his life, and on his eldest legitimate son surviving at the time of his death, our island of Sam Joham which he has just lately discovered fifty leagues over the sea from our land of the holy cross."<sup>1</sup>

This is a portion of the patent issued by the King of Portugal, January 24th, 1504, at "Lixboa," and recorded in the royal archives of Portugal.<sup>2</sup> Now "Sam Joham," or in modern Portuguese,

<sup>1</sup> The original name given Brazil by Cabral was *Vera Cruz*. It was generally known, however, as the *Terra da Santa Cruz* until about the middle of the sixteenth century when the name Brazil was generally adopted.

<sup>2</sup> Real Archivo, Bk. 37, Chanc. D. Joao III., Fol. 152. (Dairio de Pero Lopes, p. 71-2.)

Sao Joao, was the original name of the island, and after this patent it appears to have been known by the name of its owner, Fernam, or Fernando, de Noronha.

From this document, and others relating to the fleet in which Fernando de Noronha sailed, it is believed that the island was discovered on the 24th of June (St. John's Day), 1503, and that it was called the island of "Sam Joham," or St. John, in accordance with the usage of the times, which was to name places after the saints upon whose days the discoveries were made.

Americus Vespucius claims to have visited this island on his fourth voyage,<sup>1</sup> six weeks after its discovery by Fernando de Noronha. I am aware that historians question whether this voyage was ever really made by Americus Vespucius, but judging from the description given by him it must be confessed that if that navigator did not himself see this island, he obtained his information concerning it from some one who did visit it, and for our purposes this serves the same end. If his informant was a member of Fernando de Noronha's party, it is only the more valuable in the present connection. The description given by Americus Vespucius is brief, but it is the earliest one published, and therefore the most important for the present discussion. According to this account he touched here August 10th, 1503, and he writes:—

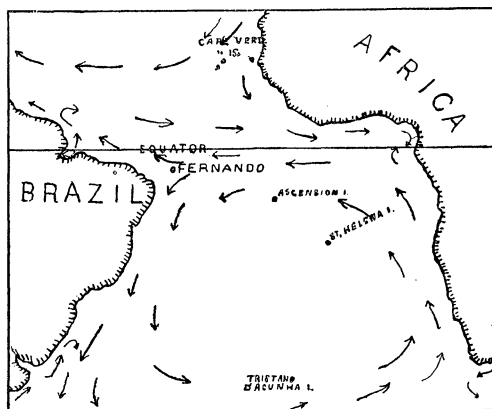
" . . . . Which island we found inhabited, and it contained plenty of trees, and so many birds, both marine and land, that they were without number, and they were so tame that they allowed themselves to be caught with the hand; and we caught so many that we loaded a boat with them; and we saw no other animals except very big rats and lizards with two tails, and some snakes."

As the introduction of birds, whether marine or land, upon an island 230 miles from a large continent, cannot be regarded as difficult or impossible, the presence of birds upon Fernando may be passed by as of no particular importance. The interest in this case centres upon the "big rats and lizards with two tails and some snakes" mentioned by Americus Vespucius. As the island was discovered but six weeks prior to the reported visit of this

<sup>1</sup> Stanislaw Canovai's *Viaggi d'Amerigo Vespucci*, Ed. 1817, p. 110, *et seq.*

navigator, it is clearly impossible that these animals, if imported by the discoverer, could have multiplied in so short a time sufficiently to have attracted attention. Nothing is said of the mice, and it may therefore be that these are or are not aboriginal inhabitants of the island. But the rats are here, and the lizards with two tails, the only ones likely to attract the attention are here, and the *Amphisbæna* is here, an animal bearing such a resemblance to a snake that by most people it is called a snake, even to this day.

Where did these animals come from? Rats are world-wide in their distribution; the species of lizard found here has never been found elsewhere; *Amphisbæna* is abundant in Brazil, and in Africa, and one genus (*Blanus*) is found about the Mediterranean. If we suppose that they migrated from the Brazilian mainland, and that the *Euprepes* does occur, but has not yet been found there, a question as to method arises. Now as the ocean currents do not,



at any time of the year, set eastward, northeastward or southeastward from the eastern part of the South American continent in the direction of the island of Fernando de Noronha, the chance of such animals being carried from the Brazilian mainland are extremely small. The island receives the currents from the southwestern coast of Africa, as is shown in the accompanying cut; indeed the west flowing south equatorial current divides just about here, the current striking the island and flowing either to the northwest or to the southwest along the Brazilian mainland, according to the time of the year and the direction of the trade winds. The wind

charts usually represent the prevailing winds in this region as coming from the southeast. During the months of June, July, August, and September, they do come from that direction approximately, but during the remainder of the year they are usually from the northeast.<sup>1</sup> The ocean currents shift slightly with these prevailing winds, so that when the winds from the northeast have prevailed for some time, the main body of the south equatorial current seems to be carried further south. Such changes throw upon Fernando at one time the currents from southwest Africa, and at others probably some of the counter-currents from the North Atlantic or from the Gulf of Guinea.

Dr. Alfred R. Wallace, with whom the writer has spoken in regard to this question, suggests that these animals may have been introduced upon the floating trunks of trees from Africa. If we admit that such animals could endure so long an ocean voyage, the explanation satisfies the demands of the case as far as we are acquainted with them.

The long existence of navigation as a science prior to the discovery of America, suggests that rats might have been carried here upon a wrecked vessel. But even admitting that the *Amphisbæna* and the lizard might have come from some part of the Mediterranean, the chances of such animals finding their way upon board vessels are so extremely small that this hypothesis seems to have but little or no value.

It has been suggested also that the islands of Fernando may have been joined to the Brazilian mainland at one time, and that by the cutting away of the isthmus joining the two, the island was thus left with the fauna found by its discoverers. The form of the ocean's bottom between the mainland and the island puts this hypothesis out of question. It was formerly supposed that Fernando had once been the northeastern point of Brazil, but the deep-sea soundings by the Challenger expedition show that this is not true, and that Fernando is separated from the mainland by a trough more than 12,000 feet deep. In the light of these facts the question remains: where did these animals come from, and how did they get here?

<sup>1</sup> During my stay upon this island, in the months of July and August, the wind varied but little from due east, being at times from the E. N. E., and at others from the E. S. E.